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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,169	09/09/2003	Jae-Hoon Lee	YPL-0061	3342

23413 7590 11/23/2005

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EXAMINER	
NATALINI, JEFF WILLIAM	
ART UNIT	**PAPER NUMBER**
2858	

DATE MAILED: 11/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/658,169	LEE ET AL.	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☒ Claim(s) *10 and 11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Objections

1. Claims 1, 2, 9 and 10 are objected to because of the following informalities:

- In regard to claim 1, as amended sates the measuring is "performed in the absence of an additional probe to ...", but there is no previous probe in the claim, and therefor the use of the word additional is unclear. It seems as though it should state "a probe" and will be examined as though this is stated.
- In regard to claim 2, as amended states "wherein the electrode", but there is not single electrode in claim one. Suggestions to fix this claim would be: "the electrodes do not comprise" or "neither of the electrodes comprise"
- In regard to claims 9 and 10, "with increase of the number of PCR cycles", does not contain proper grammatical flow. Possibly corrections: "with an increase in the number of PCR cycles" or "with increasing the number of PCR cycles"

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Backburn et al. (6264825) in view of Frazier et al. (6169394).

In regard to claims 1, 2, 4 Blackburn et al. discloses a method for detecting a polymerase chain reaction (PCR) product (col 88 line 5-7) comprising:

providing at least a pair of electrodes (col 88 line 8-15) in a PCR solution containing vessel (col 90 line 38-42);

performing PCR (col 87 line 60- col 88 line 15);

producing an electric field between the electrodes (col 83 line 65 – col 84 line 14); and

measuring a change in a dielectric property in a PCR solution (col 83 line 49-55; bulk impedance is known in the art to be the dielectric property of impedance of the solution between the two electrodes).

Blackburn et al. lacks specifically wherein the measuring is performed in the absence of a probe for generating an electrical signal, and wherein the electrodes do not have an attached probe for generating an electrical signal that binds to the reactants or products of the PCR (this is all explained in the remarks pgs 5-7).

Frazier et al. discloses a microelectric detector for providing conductivity or impedance measurements to particulate-containing fluids and biological materials (abstract). Includes that micromachining technology have been implemented in analyzing systems including polymerase chain reaction (col 2 line 48-col 3 line 6). A pair of electrodes without a probe for generating an electrical signal (fig 2a or 2b (46); no attached probe for containing an electrical signal is disclosed in the patent) are

disposed on opposite sidewalls to create a detection zone where the sample will be (abstract), producing an electric field between the electrodes (col 4 line 15-21), and measuring a change in a dielectric property without a probe for generating an electrical signal (impedance; corresponding to claim 4) of the test sample (col 4 line 21-25; conductivity and impedance measurements are taken; no probe is disclosed in the patent to be present during measuring).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Blackburn et al. to incorporate the measuring method of Frazier et al. (that discusses detection of PCR systems) that is able to do the exact same measurement and analysis that Blackburn et al. does without the use of a attached probe for the electrodes or a probe for measuring in order to have an simple and inexpensive detection system to provide high resolution measurement of the electrical characteristics of biological systems (col 3 line 3-14).

In regard to claim 3, Blackburn et al. discloses where the PCR solution-containing vessel is a PCR tube (col 90 line 38-42).

In regard to claim 4 (additional rejection as claim 4 is also rejected above), Blackburn et al. discloses wherein the dielectric property is impedance (col 83 line 49-55; bulk impedance is known in the art to be the dielectric property (col 1 line 38-40) of impedance of the solution between the two electrodes).

In regard to claim 5, Blackburn et al. discloses wherein the electric field is produced using an alternating current at a frequency of 1 Hz to 100MHz (col 84 line 11-14).

In regard to claim 6, Blackburn et al. discloses wherein the electric field is produced using an average AC voltage of 1mV to 10V (col 84 line 7-11).

In regard to claim 7, Blackburn et al. discloses wherein the PCR solution-containing vessel includes a PCR tube (col 90 line 38-42), and the electrodes are installed to be opposite to each other at a predetermined height from a bottom of the PCR tube (fig 1E, electrodes (20) are opposite each other at a determined height).

In regard to claim 8, Blackburn et al. discloses wherein the PCR solution-containing vessel includes polymerization microchamber (fig 1 or 2 shows a chamber where polymerization occurs), where electrodes are installed at upper and lower sides of the microchamber (fig 2 shows upper side electrodes (12, 13) and lower side electrodes (17,16)).

In regard to claim 9, Blackburn et al. discloses connecting an impedance sensor to the electrodes to measure a change in an impedance magnitude with an increase in PCR cycles (col 81 line 49-55 says the change in impedance is 'monitored', this change will occur over time/PCR cycles).

Allowable Subject Matter

4. Claims 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and all the objections to the claims are overcome.

In regard to claim 10, the prior art does not disclose or render obvious wherein a change in impedance magnitude is measured during an increase of the number of PCR cycles at a predetermined alternating current voltage frequency in the combination as claimed.

Claim 11, would be allowable because it depends from claim 10.

Response to Arguments

5. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

ANJAN DEB
PRIMARY EXAMINER